

AMENDMENTS TO THE CLAIMS

Please amend/cancel claims 1-39 as shown below. Claims 40-48 have been withdrawn as being drawn to a nonelected invention. Please add new claims 49-66 as shown below.

1 1. (Currently amended) A method for responding to a request to transfer data
2 from a virtual computer system to a computer network, the virtual computer system
3 comprising a plurality of physical network interface cards (NICs), the method comprising
4 the steps of:

5 determining NIC management information related to ~~possible one or more~~
6 of the plurality of NICs over which the data may be transferred;

7 determining VM-specific information related to one or more virtual
8 machines (VMs) in the virtual computer system;

9 based on the NIC management information and the VM-specific
10 information, deciding whether to transfer the data; and

11 if a decision is made not to transfer the data, discarding the data; or

12 if a decision is made to transfer the data, then, based on the NIC
13 management information and the VM-specific information, selecting a NIC
14 from the plurality of NICs over which to transfer the data and transferring
15 the data over the selected NIC.

1 2. (Original) The method of claim 1, in which the VM-specific information
2 indicates an amount of network bandwidth that is allocated to a VM that requested the
3 data transfer.

1 3. (Original) The method of claim 2, in which a decision is made not to
2 transfer the data because transferring the data would cause the VM's allocation of
3 network bandwidth to be exceeded.

1 4. (Original) The method of claim 1, in which the VM-specific information
2 indicates the priority of the VM that requested the data transfer relative to the priorities
3 of other virtual machines.

1 5. (Currently amended) The method of claim 1, in which the NIC
2 management information indicates which one or more of the available plurality of NICs
3 is available for the transfer of ~~over which the data may be transferred.~~

1 6. (Currently amended) The method of claim 5, in which the NIC
2 management information further indicates a pending data transfer load for each of the
3 available NICs ~~over which the data may be transferred.~~

1 7. (Original) The method of claim 1, in which a load distribution function,
2 based on the NIC management information and the VM-specific information, is used in
3 selecting a NIC over which to transfer the data.

1 8. (Original) The method of claim 7, in which a first VM's data transfer
2 requests are substantially always routed over a first NIC as long as the first NIC is
3 available, and a second VM's data transfer requests are substantially always routed
4 over a second NIC as long as the second NIC is available, but the first VM's data
5 transfer requests are routed over the second NIC if the first NIC is not available, and the
6 second VM's data transfer requests are routed over the first NIC if the second NIC is not
7 available.

1 9. (Original) The method of claim 8, in which the first VM's data transfer
2 requests are distinguished from the second VM's data transfer requests by reference to
3 a source physical address contained in a header of each data transfer request.

1 10. (Currently amended) The method of claim 1, in which the NIC
2 management information indicates whether a failover is occurring on one of the NICs
3 ~~over which the data could otherwise have been transferred.~~

1 11. (Currently amended) The method of claim 10, in which the VM that has
2 requested the data transfer is temporarily suspended if a failover is occurring on one of
3 the NICs ~~over which the data could otherwise have been transferred.~~

12. Canceled

13. (Original) The method of claim 1, wherein, if a decision is made not to transfer the data, a further decision is made whether to suspend the VM that requested the data transfer.

14. (Original) The method of claim 1, wherein, if a decision is made not to transfer the data, a further decision is made whether to migrate the VM that requested the data transfer to another computer system.

Claims 15-29 (Canceled)

30. (Currently amended) A method for responding to requests to transfer routing data between from a virtual computer system and to a physical computer network, the virtual computer system comprising a first VM and a second VM, the virtual computer system also comprising a first physical network interface card (NIC) and a second physical NIC for connecting to the computer network, the method comprising the steps of:

determining that the second NIC is not available for transferring data;
determining that the first VM has a higher priority than the second VM; and
for each data transfer request:

determining which VM within the virtual computer system is involved in the requested data transfer; and

if the first VM is involved in the requested data transfer,
routing transferring the data over the first NIC; or

if the second VM is involved in the requested data transfer,
in response to determining that the second NIC is not available,
routing discarding the data over the second NIC.

Claims 31-39 (Canceled)

1 40. (Withdrawn) A method for managing network access between a virtual
2 computer system and a computer network, the virtual computer system comprising a
3 plurality of VMs, the virtual computer system being susceptible to possible adverse
4 effects from a Denial of Service attack, the method comprising:
5 monitoring data that is transferred between the virtual computer system
6 and the computer network for an indication of a possible Denial of Service attack;
7 and
8 if an indication of a possible Denial of Service attack is detected,
9 suspending one or more of the VMs, to reduce the risk of adverse effects on one
10 or more other VMs.

1 41. (Withdrawn) A method for managing network access between a VM and a
2 computer network, the VM executing in a first physical computer system having access
3 to a first connection to the computer network, the first connection being susceptible to
4 possible adverse effects from a Denial of Service attack, the method comprising:
5 monitoring data that is transferred between the VM and the computer
6 network for an indication of a possible Denial of Service attack; and
7 if an indication of a possible Denial of Service attack is detected, migrating
8 the VM to a second physical computer system having access to a second
9 connection to the computer network.

1 42. (Withdrawn) The method of claim 41, wherein the step of monitoring the
2 data involves monitoring the quantity of network traffic that is transferred between the
3 VM and the computer network.

1 43. (Withdrawn) The method of claim 41, wherein the first and second
2 physical computer systems are connected directly to the computer network.

1 44. (Withdrawn) A method for managing network access between a virtual
2 computer system and a computer network, the virtual computer system comprising a
3 VM, the virtual computer system being susceptible to possible adverse effects from a
4 Denial of Service attack, the method comprising:
5 monitoring data that is transferred from the computer network to the virtual
6 computer system for an indication of a possible Denial of Service attack; and
7 upon detecting data directed toward the VM, where the data indicates a
8 possible Denial of Service attack, delaying the processing of the data by the VM
9 to allow for one or more defensive measures against the possible Denial of
10 Service attack.

1 45. (Withdrawn) The method of claim 44, wherein the processing of the data
2 by the VM is delayed by delaying an interruption to the VM regarding receipt of the data
3 frame.

1 46. (Withdrawn) The method of claim 44, wherein the processing of the data
2 by the VM is delayed by temporarily suspending the VM.

1 47. (Withdrawn) method of claim 44, wherein the processing of the data by the
2 VM is delayed by delaying scheduling of the VM for CPU execution time.

1 48. (Withdrawn) The method of claim 44, wherein the one or more defensive
2 measures comprises failing over from the use of a first set of one or more NICs to the
3 use of a second set of one or more NICs.

1 49. (New) The method of claim 30, further comprising suspending the second
2 VM in response to determining that the second NIC is not available.

1 50. (New) The method of claim 30, further comprising migrating the second
2 VM to another computer system in response to determining that the second NIC is not
3 available.

1 51. (New) A computer program embodied in a tangible, computer-readable
2 medium, the computer program performing a method for responding to a request to
3 transfer data from a virtual computer system to a computer network, the virtual
4 computer system comprising a plurality of physical network interface cards (NICs), the
5 method comprising the steps of:
6 determining NIC management information related to one or more of the
7 plurality of NICs;
8 determining VM-specific information related to one or more virtual
9 machines (VMs) in the virtual computer system;
10 based on the NIC management information and the VM-specific
11 information, deciding whether to transfer the data; and
12 if a decision is made not to transfer the data, discarding the data; or
13 if a decision is made to transfer the data, then, based on the NIC
14 management information and the VM-specific information, selecting a NIC
15 from the plurality of NICs and transferring the data over the selected NIC.

1 52. (New) The computer program of claim 51, in which the VM-specific
2 information indicates an amount of network bandwidth that is allocated to a VM that
3 requested the data transfer.

1 53. (New) The computer program of claim 52, in which a decision is made not
2 to transfer the data because transferring the data would cause the VM's allocation of
3 network bandwidth to be exceeded.

1 54. (New) The computer program of claim 51, in which the VM-specific
2 information indicates the priority of the VM that requested the data transfer relative to
3 the priorities of other virtual machines.

1 55. (New) The computer program of claim 51, in which the NIC management
2 information indicates which one or more of the available plurality of NICs is available for
3 the transfer of data.

1 56. (New) The computer program of claim 55, in which the NIC management
2 information further indicates a pending data transfer load for each of the available NICs.

1 57. (New) The computer program of claim 51, in which a load distribution
2 function, based on the NIC management information and the VM-specific information, is
3 used in selecting a NIC over which to transfer the data.

1 58. (New) The computer program of claim 57, in which a first VM's data
2 transfer requests are substantially always routed over a first NIC as long as the first NIC
3 is available, and a second VM's data transfer requests are substantially always routed
4 over a second NIC as long as the second NIC is available, but the first VM's data
5 transfer requests are routed over the second NIC if the first NIC is not available, and the
6 second VM's data transfer requests are routed over the first NIC if the second NIC is not
7 available.

1 59. (New) The computer program of claim 58, in which the first VM's data
2 transfer requests are distinguished from the second VM's data transfer requests by
3 reference to a source physical address contained in a header of each data transfer
4 request.

1 60. (New) The computer program of claim 51, in which the NIC management
2 information indicates whether a failover is occurring on one of the NICs.

1 61. (New) The computer program of claim 60, in which the VM that has
2 requested the data transfer is temporarily suspended if a failover is occurring on one of
3 the NICs.

1 62. (New) The computer program of claim 51, wherein, if a decision is made
2 not to transfer the data, a further decision is made whether to suspend the VM that
3 requested the data transfer.

1 63. (New) The computer program of claim 51, wherein, if a decision is made
2 not to transfer the data, a further decision is made whether to migrate the VM that
3 requested the data transfer to another computer system.

1 64. (New) A computer program embodied in a tangible, computer-readable
2 medium, the computer program performing a method for responding to requests to
3 transfer data from a virtual computer system to a physical computer network, the virtual
4 computer system comprising a first VM and a second VM, the virtual computer system
5 also comprising a first physical network interface card (NIC) and a second physical NIC
6 for connecting to the computer network, the method comprising:
7 determining that the second NIC is not available for transferring data;
8 determining that the first VM has a higher priority than the second VM; and
9 for each data transfer request:
10 determining which VM within the virtual computer system is
11 involved in the requested data transfer; and
12 if the first VM is involved in the requested data transfer,
13 transferring the data over the first NIC; or
14 if the second VM is involved in the requested data transfer,
15 in response to determining that the second NIC is not available,
16 discarding the data.

1 65. (New) The computer program of claim 64, further comprising suspending
2 the second VM in response to determining that the second NIC is not available.

1 66. (New) The computer program of claim 64, further comprising migrating the
2 second VM to another computer system in response to determining that the second NIC
3 is not available.